## AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently amended) A computer implemented method to derive a model comprising ~~find~~ a mathematical equation that fits a data set having one dependent variable and a plurality of ~~at least one~~ independent ~~variable~~ variables comprising: the steps of

determining the relative contribution of ~~the at least one~~ each independent variable to the dependent variable;[[,]]] and

~~defining~~ determining separate functions that each describe the contribution of ~~a single~~ each independent variable to the dependent variable, wherein the functions used to describe the contribution of an independent variable to the dependent variable are determined ~~derived~~ sequentially, using residuals of the dependent variable~~, wherein the residuals comprise~~ to define the portion of the dependent variable for which a contributing independent variable has not been defined, such that at each stage of the analysis, the model comprises contributions from an increasing number of independent variables.

2. (Currently amended) The method of claim 1, wherein the plurality of independent variables are fit to the data set in order of the relative contribution of each independent variable, such that an independent variable that makes a larger contribution to the dependent variable is fit to the data prior to an independent variable that makes a smaller contribution to the dependent variable ~~the analysis of residuals is done sequentially, such that at each stage of the analysis, the residuals comprise contributions from a decreasing number of independent variables~~.

3. (Currently amended) The method of claim 1, wherein the functions used to define the contribution of each independent variable to the dependent variable comprise a set of families of functions ~~the method is automatic in that once a user initiates the analysis by inputting a signal to the computer processor, the processor performs the method with no further input from the user~~.

4. (Original) The method of claim 1, further comprising calculating a value for missing data for at least one independent variable.

5. (Currently amended) The method of claim 1, further comprising minimizing the number of terms in the final model ~~providing a quantitative evaluation of the significance of each independent variable to the equation~~.

6. (Currently amended) A computer implemented method to derive a model comprising ~~find~~ a mathematical equation that fits a data set having one dependent variable and a plurality of ~~at least one~~ independent ~~variable~~ variables comprising the steps of:

(a) identifying the independent variable that makes the largest contribution to the dependent variable as the first most important independent variable;

(b) ~~plotting the~~ comparing the numerical values for the dependent variable versus a plurality of transformations of the first most important independent variable, wherein each transformation uses a distinct mathematical function selected from a set of families of functions, to identify ~~determine~~ a function that provides ~~a model having~~ the best fit of the first independent variable to the data;

(c) identifying the independent variable that makes the next largest contribution to the ~~dependent variable~~ residual values of the dependent variable as the next most important independent variable;

(d) ~~plotting the~~ comparing values for the residuals of the dependent variable versus a plurality of transformations of the next most important variable, wherein each transformation uses a distinct mathematical function selected from a set of families of functions, to ~~determine~~ identify a function that ~~comprises~~ provides the best fit of the next most important independent variable to the residuals, wherein the residuals of the dependent variable are ~~comprise~~ the portion of the dependent variable for which a contributing independent variable has not yet been defined; and

(e) repeating steps (c) and (d) to identify the next most important independent variable until ~~an optimal number of independent variables having associated functions to describe~~ the contribution of each independent variable to the dependent variable has ~~have~~ been determined.

7. (Currently amended) The method of claim 6, wherein the set of families of functions that are used to fit each independent variable ~~variables~~ to values for the dependent variable or residuals of the dependent variable are the same ~~chosen from at least one predetermined set of functions~~.

8. (Currently amended) The method of claim 6, wherein step (a) comprises the substeps of:

(i) ~~plotting~~ comparing the values for the dependent variable versus a plurality of transformations of each independent variable from the data set, wherein each transformation uses a function selected from a set of families of functions;

(ii) determining the fit for each independent variable with each of the functions tested in step (i); and

(iii) identifying the most important independent variable as the variable having the best fit with at least one of the tested functions.

9. (Currently amended) The method of claim 8, wherein the set of functions used to ~~identify~~ characterize the relative importance of each of the independent variables is smaller than the set of functions used to fit each of the independent variables to the dependent variable or residuals of the dependent variable.

10. (Currently amended) The method of claim 6, wherein step (c) comprises the substeps of:

(i) ~~plotting~~ comparing the residual values for the dependent variable versus transformations of each independent variable ~~any independent variables~~ that have not been fit to the dependent variable or residuals of the dependent variable, wherein each transformation uses a distinct mathematical function selected from a set of families of functions;

(ii) determining the fit for the residual values for the dependent variable versus each of the transformations of each of the remaining independent variables; and

(iii) identifying the next most important independent variable as the variable having the best fit upon transformation with one of the selected functions with the residual values for the dependent variable.

11. (Currently amended) The method of claim 6, further comprising generating a report comprising a model, wherein the model ~~at least one equation that~~ includes at least one optimized function for each ~~at least one~~ independent variable ~~to describe the value of the dependent variable for the entire data set~~.

12. (Currently amended) The method of claim 11, wherein the report includes ~~generating~~ a list of optimized models ~~functions to explain the data set~~, wherein each of the functions in the list are rated for relative fit to the data using a predetermined statistical function.

13. (Currently amended) The method of claim 12, wherein the list of optimized models includes models that comprise a decreasing number of independent variables to describe the fit of the data to the dependent variable ~~includes functions that include an increasing number of independent variables~~.

14. (Original) The method of claim 6, further comprising calculating a value for missing data for at least one independent variable.

15. (Original) The method of claim 14, wherein values for missing data are calculated by generating a model or best function without missing the data, and then using the model or best function to derive an approximated value for the missing data.

16. (Canceled)

17. (Original) The method of claim 14, wherein the approximated values determined for missing data at one step are used to derive best fit models in subsequent curve-fitting steps.

18. A computer implemented method to ~~find~~ derive a model comprising a mathematical equation that fits a data set while minimizing the number of terms in the final model comprising the steps of:

(a) organizing the data as one dependent variable (y) and a plurality of ~~at least one~~ independent variables ~~variable~~ ($x_1$, $x_2$, . . . $x_{n-1}$, $x_n$);

(b) determining which independent variable comprises the most significant contribution to the dependent variable by using a program code that performs the following substeps:

(i) comparing ~~plotting the~~ values of the dependent variable versus transformations of each of the independent variables, wherein each transformation uses a distinct mathematical function selected from a ~~against an initial~~ set of selected families of functions (~~$F_{initial}$~~) of each independent variable ($x_1$, $x_2$, $x_3$, … $x_{n-1}$, $x_n$);

(ii) analyzing how well each function describes the values for the dependent variable (y) for each independent variable; and

(iii) choosing an independent variable ($x_1$) which comprises the best fit to the dependent variable upon transformation with the ~~for any one of~~ the ~~predetermined number of~~ analyzed functions;

(c) determining a function, $f(x_1)$, and constants, $m_1$ and $b_1$, from a ~~an expanded~~ set of families of functions[[,]] which best describes fit of the data to the independent variable comprising the most significant contribution to the dependent variable;

(d) determining the residuals $(y - \hat{y}_1)$, where $\hat{y}_1 = m_1 * f(x_1) + b_1$ is the calculated value of (y) for $x_1$;

(e) determining the next most significant independent variable by comparing ~~plotting~~ the value of the residuals $(y - \hat{y}_1)$ ~~against~~ versus a plurality of transformations ~~an initial set of functions~~ of the remaining independent variables ($x_2$, $x_3$, . . . $x_{n-1}$, $x_n$), wherein each transformation uses a distinct mathematical function selected from a set of families of functions, and choosing the independent variable ($x_2$) which comprises the best fit to the residuals using ~~for any~~ one of the ~~predetermined number of~~ analyzed functions;

(f) determining a function, $f(x_2)$, and constants, $m_2$ and $b_2$, from a ~~an expanded~~ set of families of functions, which best describes the independent variable comprising the next most significant contribution to the residuals for the dependent variable $(y - \hat{y}_1)$;

(g) determining the residuals $(y - \hat{y}_{1,2}) = y - ((m_1' * f(x_1)) + (m_2' * f(x_2)) + b')$;

(h) ~~plotting selected functions of~~ comparing a plurality of transformations of the remaining independent variables ( $x_3$, . . . $x_{n-1}$, $x_n$) versus the second level residuals ($y - \hat{y}_{1,2}$), wherein each transformation uses a distinct mathematical function selected from a set of selected families of functions in order to determine the next most significant independent variable ($x_3$ ) and choosing the independent variable ($x_3$) which comprises the best fit to the residual for one of the analyzed functions;

(i) determining a function $f(x_3)$, and new constants, $m_3$ and $b_3$, which best describes the mathematical relationship between $x_3$ and ($y - \hat{y}_{1,2}$) from a ~~second expanded~~ set of families of ~~pre-selected~~ functions ($F_{S2}$);

(j) repeating steps (g)-(i) using increasing levels of residuals ($y-y_{1,2,3,\ldots n-1}$) to characterize additional independent variables ($x_4$, . . . $x_{n-1}$, $x_n$) until the contribution of each independent variable to ~~an optimal number of functions to describe~~ the dependent variable ~~identified~~ (y) ~~have~~ has been described; and

(k) generating a model comprising an equation which includes at least one optimized function for ~~at least one~~ each independent variable to describe the value of the dependent variable for the entire data set.

19. (Currently amended) A computer-readable medium on which is encoded programming code to ~~find~~ derive a model comprising a mathematical equation that fits a data set having one dependent variable and a plurality of ~~at least one~~ independent ~~variable~~ variables comprising: program code for determining the relative contribution of ~~the at least one~~ each independent variable to the dependent variable;[[,]]] and for ~~defining~~ determining separate functions that each describe the contribution of ~~a single~~ each independent variable to the dependent variable, wherein the functions used to describe the contribution of an independent variable to the dependent variable are determined ~~derived~~ sequentially, using residuals of the dependent variable~~, wherein the residuals comprise~~ to define the portion of the dependent variable for which a contributing independent variable has not been defined, such that at each stage of the analysis, the model comprises contributions from an increasing number of independent variables.

20. (Currently amended) The computer-readable medium of claim 19, wherein the program code defines that the plurality of independent variables are fit to the data set in order of the relative contribution of each independent variable, such that an independent variable that makes a larger contribution to the dependent variable is fit to the data prior to an independent variable that makes a smaller contribution to the dependent variable ~~the analysis of residuals is done sequentially, such that at each stage of the analysis, the residuals comprise contributions from a decreasing number of independent variables~~.

21. (Currently amended) The computer-readable medium of claim 19, wherein the program code defines that the functions used to define the contribution of each independent variable to the dependent variable comprise a set of families of functions ~~the method is automatic in that once a user initiates the analysis by inputting a signal to the computer processor, the processor performs the method with no further input from the user~~.

22. (Original) The computer-readable medium of claim 19, further comprising program code for calculating a value for missing data for at least one independent variable.

23. (Currently amended) The computer-readable medium of claim 19, further comprising program code for minimizing the number of terms in the final model ~~providing a quantitative evaluation of the significance of each independent variable to the equation~~.

24. (Currently amended) A computer-readable medium on which is encoded programming code to ~~find~~ derive a model comprising a mathematical equation that fits a data set having one dependent variable and a plurality of ~~at least one~~ independent ~~variable~~ variables comprising:

(a) program code for identifying the independent variable that makes the largest contribution to the dependent variable as the first most important independent variable;

(b) program code for ~~plotting the~~ comparing the numerical values for the dependent variable versus a plurality of transformations of the first most important independent variable, wherein each transformation uses a distinct mathematical function selected from a set of families

of functions, to identify ~~determine~~ a function that provides ~~a model having~~ the best fit of the first independent variable to the data;

(c) program code for identifying the independent variable that makes the next largest contribution to the ~~dependent variable~~ residual values of the dependent variable as the next most important independent variable;

(d) program code for ~~plotting the~~ comparing values for the residuals of the dependent variable versus a plurality of transformations of the next most important variable, wherein each transformation uses a distinct mathematical function selected from a set of families of functions, to ~~determine~~ identify a function that ~~comprises~~ provides the best fit of the next most important independent variable to the residuals, wherein the residuals of the dependent variable are ~~comprise~~ the portion of the dependent variable for which a contributing independent variable has not yet been defined; and

(e) program code for repeating steps (c) and (d) to identify the next most important independent variable until ~~an optimal number of independent variables having associated functions to describe~~ the contribution of each independent variable to the dependent variable has ~~have~~ been determined.

25. (Currently amended) The computer-readable medium of claim 24, further comprising program code for choosing the set of families of functions that are used to fit each independent variable ~~variables~~ to values for the dependent variable or residuals of the dependent variable ~~chosen from at least one predetermined set of functions~~.

26. (Currently amended) The computer-readable medium of claim 24, wherein the program code for (a) further comprises:

(i) program code for ~~plotting~~ comparing the values for the dependent variable versus a plurality of transformations of each independent variable from the data set, wherein each transformation uses a function selected from a set of families of functions;

(ii) program code for determining the fit for each independent variable with each of the functions tested in step (i); and

(iii) program code for identifying the most important independent variable as the variable having the best fit with at least one of the tested functions.

27. (Currently amended) The computer-readable medium of claim 26, wherein the set of functions used to ~~identify~~ characterize the relative importance of each of the independent variables is smaller than the set of functions used to fit each of the independent variables to the dependent variable or residuals of the dependent variable.

28. (Currently amended) The computer-readable medium of claim 24, wherein the program code for (c) further comprises:

(i) program code for ~~plotting~~ comparing the residual values for the dependent variable versus transformations of each independent variable ~~any independent variables~~ that have not been fit to the dependent variable or residuals of the dependent variable, wherein each transformation uses a distinct mathematical function selected from a set of families of functions;

(ii) program code for determining the fit for the residual values for the dependent variable versus each of the transformations of each of the remaining independent variables; and

(iii) program code for identifying the next most important independent variable as the variable having the best fit upon transformation with one of the selected functions with the residual values for the dependent variable.

29. (Currently amended) The computer-readable medium of claim 24, further comprising program code for generating a report comprising the model, wherein the model ~~at least one equation that~~ includes at least one optimized function for each ~~at least one~~ independent variable ~~to describe the value of the dependent variable for the entire data set~~.

30. (Currently amended) The computer-readable medium of claim 29, wherein the report includes ~~generating~~ a list of optimized models ~~functions to explain the data set~~, wherein each of the functions in the list are rated for relative fit to the data using a predetermined statistical function.

31. (Currently amended) The computer-readable medium of claim 30, wherein the list of optimized models includes models that comprise a decreasing number of independent variables to describe the fit of the data to the dependent variable ~~includes functions that include an increasing number of independent variables~~.

32. (Original) The computer-readable medium of claim 24, further comprising program code for calculating a value for missing data for at least one independent variable.

33. (Original) The computer-readable medium of claim 32, further comprising program code to calculate the values for missing data by generating a model or best function without the missing data, and then using the model or best function to derive an approximated value for the missing data.

34. (Canceled)

35. (Original) The computer-readable medium of claim 32, further comprising program code to use the approximated values determined for missing data at one step to derive best fit models in subsequent curve-fitting steps.

36. A computer-readable medium on which is encoded programming code to ~~find~~ derive a model comprising a mathematical equation that fits a data set while minimizing the number of terms in the final model comprising:

(a) program code for organizing the data as one dependent variable (y) and a plurality of ~~at least one~~ independent variables ~~variable~~ ($x_1$, $x_2$, . . . $x_{n-1}$, $x_n$);

(b) program code for determining which independent variable comprises the most significant contribution to the dependent variable by using a program code that performs the following substeps:

(i) comparing ~~plotting the~~ values of the dependent variable versus transformations of each of the independent variables, wherein each transformation uses a distinct

mathematical function selected from a ~~against an initial~~ set of ~~selected~~ families of functions ~~($F_{initial}$)~~ of each independent variable ($x_1$, $x_2$, $x_3$, ... $x_{n-1}$, $x_n$);

(ii) analyzing how well each function describes the values for (y) for each independent variable; and

(iii) choosing an independent variable ($x_1$) which comprises the best fit of the dependent variable with ~~for any~~ one of the ~~predetermined number of~~ analyzed functions;

(c) program code for determining a function, $f(x_1)$, and constants, $m_1$ and $b_1$, from a ~~an expanded~~ set of families of functions[[,]] which best describes the ~~mathematical relationship between~~ fit of the data to the independent variable comprising the most significant contribution to ~~(y)~~ the dependent variable;

(d) program code for determining the residuals $(y - \hat{y}_1)$, where $\hat{y}_1 = m_1 * f(x_1) + b_1$ is the calculated value of (y) for $x_1$;

(e) program code for determining the next most significant independent variable ($x_2$) by comparing ~~plotting~~ the value of the residuals $(y - \hat{y}_1)$ ~~against~~ versus a plurality of transformations ~~an initial set of functions~~ of the remaining independent variables ($x_2$, $x_3$, . . . $x_{n-1}$, $x_n$), wherein each transformation uses a distinct mathematical function selected from a set of families of functions, and choosing the independent variable ($x_2$ ~~for example~~) which comprises the best fit for any one of the predetermined number of analyzed functions;

(f) program code for determining a function, $f(x_2)$, and constants, $m_2$ and $b_2$, from ~~an expanded~~ set of families of functions, which best describes the ~~mathematical relationship between~~ fit of the data to the independent variable comprising the next most significant contribution to the residuals for the dependent variable ~~(y)~~;

(g) program code for determining the residuals $(y - \hat{y}_{1,2}) = y - ((m_1' * f(x_1)) + (m_2' * f(x_2)) + b')$;

(h) program code for ~~plotting selected functions of~~ comparing a plurality of transformations of the remaining independent variables ( $x_3$, . . . $x_{n-1}$, $x_n$) versus the second level residuals $(y - \hat{y}_{1,2})$, wherein each transformation uses a distinct mathematical function selected from a set of selected families of functions in order to determine the next most significant independent variable ($x_3$ ) and choosing the independent variable ($x_3$) which comprises the best fit to the residuals for one of the analyzed functions;

(i) program code for determining a function $f(x_3)$, and new constants, $m_3$ and $b_3$, which best describes the mathematical relationship between $x_3$ and $(y - \hat{y}_{1,2})$ from a ~~second expanded~~ set of families of ~~pre-selected~~ functions ($F_{S2}$);

(j) program code for repeating steps (g)-(i) using increasing levels of residuals ($y-y_{1,2,3,\ldots n-1}$) to characterize additional independent variables ($x_4, \ldots x_{n-1}, x_n$) until the contribution of each independent variable to ~~an optimal number of functions to describe~~ the dependent variable ~~identified~~ (y) ~~have~~ has been ~~and~~ described; and

(k) program code for generating a model comprising an equation which includes at least one optimized function for ~~at least one~~ each independent variable to describe the value of the dependent variable for the entire data set.